

Racial Discrimination and Skin Color in the CARDIA Study: Implications for Public Health Research

ABSTRACT

Objectives. This study assessed whether skin color and ways of handling anger can serve as markers for experiences of racial discrimination and responses to unfair treatment in public health research.

Methods. Survey data on 1844 Black women and Black men (24 to 42 years old), collected in the year 5 (1990–1991) and year 7 (1992–1993) examinations of the Coronary Artery Risk Development in Young Adults (CARDIA) study, were examined.

Results. Skin color was not associated with self-reported experiences of racial discrimination in 5 of 7 specified situations (getting a job, at work, getting housing, getting medical care, in a public setting). Only moderate associations existed between darker skin color and being working class, having low income or low education, and being male (risk ratios under 2). Comparably moderate associations existed between internalizing anger and typically responding to unfair treatment as a fact of life or keeping such treatment to oneself.

Conclusions. Self-reported experiences of racial discrimination and responses to unfair treatment should be measured directly in public health research; data on skin color and ways of handling anger are not sufficient. (*Am J Public Health.* 1998;88:1308–1313)

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Research on health consequences of racial discrimination requires adequate measures of diverse exposures and responses to discrimination.^{1–3} Several US epidemiologic studies^{4–13} investigating Black–White differences in health have interpreted data on skin color as a marker for racial discrimination, and others have interpreted data on ways of handling anger as a marker for responses to discrimination.^{4,14–17}

Whether these data can legitimately serve as markers is, however, debatable. First, within the United States, long-standing social demarcations between “Whites” and “non-Whites” (regardless of hue) suggest that skin color among people of color is unlikely to be monotonically associated with experiences of racial discrimination. Supporting this hypothesis, studies show that socioeconomic gaps between African Americans or Mexican Americans with light skin and White Euro-Americans are far greater than socioeconomic gaps between African Americans or Mexican Americans with dark skin and those with light skin.^{18–22} Second, power disparities inherent in situations involving racial discrimination may affect strategies for handling anger, such that global approaches to handling anger may not provide an accurate guide for responses to unfair treatment.^{1,23–25}

To our knowledge, no empirical studies have tested the assumption that public health research can use skin color and ways of handling anger as markers for, respectively, self-reported experiences of racial discrimination and responses to unfair treatment. Therefore, we conducted a methodological study to assess these associations in an economically heterogeneous population of young African American women and men. Drawing on our own prior investigations of racial discrimination and blood pressure^{26,27} and ecosocial analyses of inequalities in health^{28,29} and on related studies on skin tone stratification^{18–20} and internalized oppression^{23–25} (which have found evi-

dence of effect modification by social class and gender), we hypothesized that (1) darker skin color would be associated with socioeconomic deprivation (especially among men), (2) associations between skin color and self-reported experiences of racial discrimination would be both context dependent (e.g., differ for discrimination at work vs from the police or in the courts) and modified by gender and social class, and (3) ways of handling anger would be only moderately associated with self-reported responses to unfair treatment (i.e., risk ratios would be less than 2).

Methods

Study Population

Our study population consisted of a large and well-defined cohort of 1844 Black women and Black men, 24 to 42 years old, who were enrolled in the Coronary Artery Risk Development in Young Adults (CARDIA) study. The CARDIA study was designed to investigate the evolution of cardiovascular risk factors. Characteristics of the CARDIA cohort and study design have been described in previous publications.^{30,31}

At baseline (1985–1986) the study enrolled 5115 young Black and White adults, 18 to 30 years old, recruited via community-based sampling from 3 cities (Birmingham,

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Ala; Chicago, Ill; and Minneapolis, Minn) and from the membership of a large prepaid health plan (Oakland, Calif); 51% of eligible persons contacted enrolled. The baseline cohort included 1480 Black women, 1157 Black men, 1307 White women, and 1171 White men, of whom 48%, 56%, 27%, and 27%, respectively, had completed at most a high school education. Participants returned for follow-up examinations conducted at year 2 (1987–1988; 91% retention), year 5 (1990–1991; 86% cumulative retention), and year 7 (1992–1993; 80% cumulative retention). All examinations were approved by institutional review boards at each institution, and informed consent was obtained at each examination from each study participant. The present study included all Black women and Black men who participated in both the year 5 and year 7 examinations.

Data Collection

Interviewers collected data on participants' self-identified race/ethnicity, gender, and date of birth at the baseline examination and verified these data at each subsequent examination. All other data analyzed in this study were obtained at the year 7 examination by either self- or interviewer-administered questionnaires or physical examination, except for data on ways of handling anger, which were obtained at the year 5 examination via a self-administered questionnaire.

Measurement of skin color, using amber, blue, and green filters of a Photovolt 577 reflectance meter,³² was based on readings taken from the medial aspect of the upper arm (a surface typically not exposed to sun). Values pertain to percentage of reflected light and can range from 0 to 100, with low values (low reflectance) indicative of dark skin. Because values for the amber, blue, and green filters were highly correlated ($P < .001$), we used data only on reflectance measured by the amber filter.

A self-administered questionnaire asked about typical responses to unfair treatment and experiences of discrimination in different situations due to "gender," "race or color," "socioeconomic position or social class," "sexual preference (heterosexual, bisexual, homosexual)," and "religion."^{26,27} Data on the cohort's responses to unfair treatment and self-reported experiences of racial discrimination were published in the previous CARDIA study on racial discrimination and blood pressure.²⁷ Following other studies,^{14–17} the self-administered questions on ways of handling anger asked respondents how likely they were (on a scale ranging from very likely to not very likely) to respond as if nothing had happened, by keeping it to themselves, or by apologizing even if they thought they were right.

To evaluate socioeconomic position, we used available data on occupation, annual family income, home ownership, and educational level. Using a previously described and validated schema,^{27,33–36} we characterized social class as either "working class" (referring to occupations in which employees typically do not own their own workplace, are not self-employed, and generally occupy subordinate positions) or "executive, professional, or supervisory" (hereafter referred to as "professional"). As described in our previous study, 66% of the participants were in working-class occupations, 94% had completed high school (including 21% who had completed at least 4 years of college), and 58% did not own their home; 44% had annual family incomes under \$25 000, while 19% had annual family incomes of \$50 000 or more.²⁷

Statistical Analyses

We developed contingency tables to analyze relevant bivariate relationships, and we used stratification to control for other factors. We modeled self-reported experiences of racial discrimination as binary data (yes/no) and responses to unfair treatment and socioeconomic position as ordinal data. Skin color data were originally collected on a continuous scale and were categorized into quartiles for these analyses.

We computed risk ratios (RRs) and their corresponding 95% confidence intervals (CIs) for 2×2 tables.³⁷ To test for trends within tables with multiple categories, we used the Cochran test for trend.³⁸ To be included in the analyses, respondents could not be missing data on race/ethnicity, gender, or social class. We then based each analysis on all cases with available data on the other required variables. This implies that sample sizes may have differed slightly across analyses. Item nonresponse, however, was very low (typically under 3%). We performed all analyses in SAS V09 on a Sun workstation.³⁹

Results

Fully 80% of the respondents reported having ever experienced racial discrimination, and the number of situations in which respondents reported racial discrimination did not vary by skin color (Table 1). Nor was skin color associated with reporting racial discrimination in 5 of the 7 specified situations (getting a job, at work, getting housing, getting medical care, in public). Among men, however, lighter skin color was associated with reporting having experienced racial discrimination at school (regardless of class). By con-

trast, darker skin color was associated with increased reporting of racial discrimination from police or in the courts, but only among working-class respondents (regardless of gender). Specifically, the percentages of working-class respondents reporting this type of discrimination were, by skin color quartile (darkest to lightest), 52%, 45%, 35%, and 35% (test for trend: $P = .001$); among professional respondents, the corresponding percentages were 39%, 41%, 42%, and 37% (test for trend: $P = .665$).

Moderate associations existed between skin color and both gender and socioeconomic position. Among working-class women, the percentages in the darkest to lightest quartiles were 20%, 24%, 27%, and 29%. Corresponding values were 16%, 24%, 30%, and 30% for professional women; 38%, 29%, 19%, and 14% for working-class men; and 26%, 24%, 26%, and 24% for professional men. Thus, whereas working-class men were 1.4 times (95% CI = 1.2, 1.7) more likely than professional men to be in the darkest skin color quartile, working-class women were as likely as their professional counterparts to be in this quartile (RR = 1.1, 95% CI = 1.0, 1.2). Darker skin color was also moderately associated with lower income and less education. Among men, 40% of those with an annual family income of less than \$12 000 were in the darkest quintile, as compared with 26% among those with an income of \$50 000 or more; the corresponding percentages for women were 22% and 11%. Similarly, 48% of the men with less than a high school education were in the darkest quintile, as compared with 29% of the men who had completed 4 or more years of college; for women, the corresponding percentages were 18% and 13%.

Associations between self-reported responses to unfair treatment and ways of handling anger were moderate and likewise varied by social class and gender (Table 2). Considering women and men together, respondents most likely to internalize anger were 1.4 to 2.9 times more likely to accept unfair treatment as a fact of life and to keep unfair treatment to themselves. These associations tended to be somewhat stronger among women than among men and among professional than among working-class respondents. For example, professional women and men who were "very likely" (vs "not too likely") to handle anger by keeping it to themselves were 5.2 times (95% CI = 1.4, 18.8) and 4.2 times (95% CI = 0.9, 18.4) more likely, respectively, to keep unfair treatment to themselves; corresponding figures among their working-class counterparts were 3.3 (95% CI = 1.5, 7.2) and 1.5 (95% CI = 0.8, 2.8).

Finally, social class and gender were also moderately associated with self-reported

TABLE 1—Self-Reported Experiences of Racial Discrimination, by Skin Color Quartile: 1047 Black Women and 797 Black Men, CARDIA Year 7 Exam

Self-Reported Experiences of Racial Discrimination, % Yes	Skin Color Quartile				Trend (<i>P</i>)
	1 (Darkest)	2	3	4 (Lightest)	
At school					
Women	29.2	34.8	33.0	34.8	.321
Men	28.7	29.8	33.5	44.9	.002
Total	28.9	32.4	33.2	38.0	.005
Getting a job					
Women	49.2	42.8	48.8	43.9	.542
Men	56.3	51.0	48.8	56.2	.635
Total	53.4	46.6	48.8	47.8	.170
At work					
Women	53.5	50.0	56.7	54.1	.534
Men	53.8	54.8	56.7	57.2	.448
Total	53.7	52.3	56.7	55.1	.415
Getting housing					
Women	31.9	27.5	31.9	27.7	.559
Men	35.0	29.8	31.3	33.3	.665
Total	33.7	28.6	31.7	29.5	.331
Getting medical care					
Women	16.2	11.0	17.0	10.8	.316
Men	15.3	13.9	8.5	10.9	.066
Total	15.7	12.4	13.9	10.8	.071
From police or in the courts					
Women	31.4	30.9	27.0	25.3	.086
Men	59.9	58.2	56.1	57.2	.486
Total	48.1	43.7	37.7	35.5	.001
On the street or in a public setting					
Women	62.7	55.9	59.6	61.5	.832
Men	65.6	66.4	66.1	70.3	.425
Total	64.4	60.8	62.0	64.3	.954
Total "yes" replies, %					
Women					
0	20.5	23.7	21.6	23.0	.782 ^a
1 or 2	29.7	28.4	27.2	29.1	
3 or more	49.7	47.9	51.2	48.0	
Men					
0	14.9	16.8	16.4	13.0	.843 ^b
1 or 2	27.1	26.0	27.9	27.5	
3 or more	58.0	57.2	55.8	59.4	
Total					
0	17.2	20.5	19.6	19.8	.359 ^c
1 or 2	28.2	27.3	27.5	28.6	
3 or more	54.6	52.2	52.9	51.6	

Note. Number of women and men in each skin color quartile (Q) (cut points based on women and men combined, based on percentage reflectance using an amber filter):

	Q1	Q2	Q3	Q4
Reflectance, %	7.1–16.9	17.0–21.2	21.3–26.3	26.4–51.2
Women, no.	185	236	282	296
Men, no.	261	208	164	138

^a $\chi^2 = 0.077$.

^b $\chi^2 = 0.039$.

^c $\chi^2 = 0.359$.

responses to unfair treatment. Overall, working-class respondents were 1.4 times (95% CI = 1.1, 1.7) more likely than their professional counterparts to accept unfair treatment as a fact of life (24% vs 18%) rather than take action. They were also 1.7 times (95% CI = 1.2, 2.3) more likely to keep quiet rather than talk to others (11% vs 6%). This latter difference was more pronounced among men

(RR = 2.0, 95% CI = 1.3, 3.2) than among women (RR = 1.3, 95% CI = 0.8, 2.3). Fully 10% of the working-class men reported that they both accepted unfair treatment as a fact of life and kept such treatment to themselves, a combination reported by only 3% to 5% of the other respondents. Similar patterns were apparent by income and educational level (data available on request).

Discussion

Our study of 1844 African American women and men provides novel empirical evidence that data on skin color and ways of handling anger cannot substitute for directly measuring self-reported experiences of racial discrimination and responses to unfair treatment. Notably, although darker skin color was moderately associated with being working class, having low income or low education, and being male, it typically was not associated with self-reported experiences of racial discrimination. Associations between ways of handling anger and responses to unfair treatment were likewise moderate. In both cases, associations were modified by both gender and social class.

Methodological Considerations

Our findings are unlikely to be due to biases in measuring skin color or other variables included in our analyses. Data on the CARDIA participants' skin color were obtained by measuring percentage reflectance of light, following standardized protocols,³² thereby ensuring consistent measurement among all study subjects. Observed values, moreover, were comparable to those reported in previous research using similar methodology.^{5,7,8–11,13,40–44} Data on self-identified race/ethnicity, gender, and age were validated at each examination, and data on sociodemographic characteristics were comparable to those obtained in other studies.³⁶ Stronger socioeconomic gradients in skin color and in self-reported experiences of racial discrimination, however, might have been detected if more refined measures of socioeconomic position had been available (e.g., data on wealth, poverty, and household social class).³⁶

As discussed in our previous research on associations between racial discrimination and blood pressure,^{26,27} evaluating the validity of data on self-reported experiences of racial discrimination and responses to unfair treatment is more complex. Not only may individuals be unaware of institutional practices discriminating against them (e.g., redlining by banks, inequalities in pay scales at work), but the phenomenon of internalized oppression may lead to underreporting of discrimination.^{1–3,23–25,45–49} This is because repeated experiences and messages devaluing lives of members of stigmatized groups may lead to accepting discrimination and unfair treatment as either "deserved" or unrecognized and, thus, unnamed.^{1,23–25,27,45–48} Alternatively, persons belonging to groups defined, in part, by discrimination may not report experiencing discrimination because they truly have not or because they may find such experiences too

TABLE 2—Self-Reported Responses to Unfair Treatment and Ways of Handling Anger: Black Women and Black Men, CARDIA Year 7 Exam

Way of Handling Anger	No.			Accept Unfair Treatment as Fact of Life			RR (95% CI)	Keep Unfair Treatment to Self			RR (95% CI)
	Women	Men	Total	Women, %	Men, %	Total, %		Women, %	Men, %	Total, %	
As if nothing happened											
Very likely	182	176	357	29.7	31.2	30.5		12.6	18.6	15.6	
Somewhat likely	478	360	838	20.5	21.1	20.8		5.4	9.8	7.3	
Not too likely	316	197	513	17.7	24.9	20.5		5.1	10.2	7.0	
Very vs not too likely											
Women							1.7 (1.2, 2.3)				2.5 (1.4, 4.6)
Men							1.3 (0.9, 1.7)				1.8 (1.1, 3.1)
Total							1.5 (1.2, 1.9)				2.2 (1.5, 3.3)
Apologize even if right											
Very likely	142	115	257	32.4	29.6	31.1		8.4	13.0	10.5	
Somewhat likely	334	257	591	20.1	24.5	22.0		8.1	13.6	10.5	
Not too likely	500	361	861	19.0	23.0	20.7		5.2	10.5	7.4	
Very vs not too likely											
Women							1.7 (1.3, 2.3)				1.6 (0.8, 3.1)
Men							1.3 (0.9, 1.8)				1.2 (0.7, 2.2)
Total							1.5 (1.2, 1.9)				1.4 (0.9, 2.2)
Keep it to self											
Very likely	266	251	517	27.8	28.7	28.2		12.4	17.5	14.8	
Somewhat likely	368	314	682	20.6	24.2	22.3		5.7	9.3	7.3	
Not too likely	342	168	510	17.0	19.0	17.7		3.2	8.9	5.1	
Very vs not too likely											
Women							1.6 (1.2, 2.2)				3.8 (2.0, 7.5)
Men							1.5 (1.0, 2.2)				2.0 (1.1, 3.4)
Total							1.6 (1.3, 2.0)				2.9 (1.9, 4.5)

Note. RR = risk ratio; CI = confidence interval.

painful to report.^{1,23-27,45-49} Self-reported experiences of racial discrimination among CARDIA's Black participants, as well as their strategies of responding to unfair treatment, nevertheless are comparable to those documented in other US research.^{23-26,45,46,49} Other studies, moreover, have reported similar associations between skin color and socioeconomic position among both African Americans^{4-7,9,10,18,19,43} and Mexican Americans.^{21,22}

One additional methodological caveat is that our data were primarily obtained during the course of a single CARDIA examination, with data on ways of handling anger collected 2 years prior to data on responses to unfair treatment. Limitations of describing associations based on cross-sectional data and on data from different time periods are well known.³⁷ Data on skin color and on experiences of racial discrimination, however, involve lifelong exposures, such that cross-sectional associations probably are accurate reflections of experiences related to age at measurement. It is also unlikely that a 2-year difference in data collection on responses to unfair treatment and ways of handling anger would markedly bias associations. Finally, because our cohort members were all young adults residing in urban areas, our findings

may not be generalizable to African Americans in rural areas or in other age groups.

Implications

Our study has several implications for analyses of the health consequences of racial discrimination. The first is that skin color should not be used as a marker for self-reported experiences of discrimination. The second is that analyses involving skin color or racial discrimination should take into account both socioeconomic position and gender. And the third is that measures pertaining to how people handle anger should not be used in lieu of obtaining data on how people respond to unfair treatment.

Notably, of the 17 US epidemiologic studies investigating skin color and the health status of African Americans,^{4-13,40-44,50,51} 12 found evidence of associations.^{4-10,12,13,40,41,44} Among these 12 studies, the 10 obtaining socioeconomic data all found that socioeconomic position either explained or strongly modified the observed associations.^{4-6,8-10,12,13,44} These results refute simplistic "genetic admixture" explanations of Black-White disparities in health, pointing instead to contributions of racial/ethnic socioeconomic inequalities to

racial/ethnic disparities in health.^{52,53} That skin color in our study was moderately associated with socioeconomic position but not associated with overall self-reported experiences of racial discrimination underscores how unperceived or unnamed exposures to racial discrimination can affect people's well-being.

In conclusion, our findings suggest that data on skin color and ways of handling anger are insufficient for rigorous analyses of racial/ethnic disparities in health. A new generation of researchers is developing creative approaches to measuring experiences of and emotional and physiologic responses to racial discrimination, as well as strategies of resistance.^{3,10,14,26,27,45,46,54-61} To advance scientific understanding of and interventions to reduce racial/ethnic inequalities in health, we encourage use of these measures in public health research, along with greater awareness of how socioeconomic position and gender may modify experiences and health consequences of racial discrimination. □

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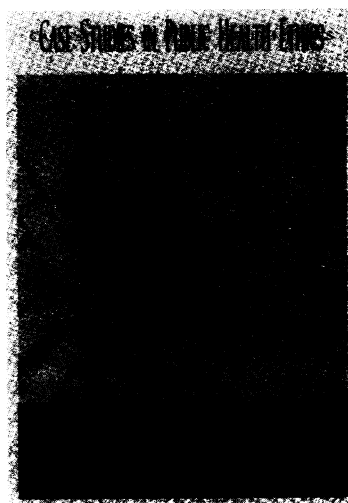
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